

L Number	Hits	Search Text	DB	Time stamp
1	507	leukoplakia	USPAT; US-PGPUB	2003/09/03 16:07
2	507	leukoplakia or leukokertosis	USPAT; US-PGPUB	2003/09/03 16:07
3	509	leukoplakia or leukokeratosis	USPAT; US-PGPUB	2003/09/03 16:07
5	123	((leukoplakia or leukokeratosis) and (carotene or beta-carotene or (vitamin adj a)))	USPAT; US-PGPUB	2003/09/03 16:09
6	0	((leukoplakia or leukokeratosis) and (carotene or beta-carotene or (vitamin adj a))) and micelled	USPAT; US-PGPUB	2003/09/03 16:09
7	2	((leukoplakia or leukokeratosis) and (carotene or beta-carotene or (vitamin adj a))) and micellized	USPAT; US-PGPUB	2003/09/03 16:10
8	16	((leukoplakia or leukokeratosis) and (carotene or beta-carotene or (vitamin adj a))) and micronized	USPAT; US-PGPUB	2003/09/03 16:10
4	40	(leukoplakia or leukokeratosis) and carotene	USPAT; US-PGPUB	2003/09/03 16:17
9	67	cremophor and carotene	USPAT; US-PGPUB	2003/09/03 16:18
10	68	cremophor and carotene	USPAT; US-PGPUB; JPO;	2003/09/03 16:19
11	13	(cremophor and carotene) and linoleate	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:21
12	2	(cremophor and carotene) and (leukoplakia or leukokeratosis)	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:20
13	66	glycerol and cremophore	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:21
14	7	(glycerol and cremophore) and carotene	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:22
15	2	"6350784" .pn.	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:23
16	82122	polyol	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:46
17	9	"2120939"	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:47
18	1	gb adj "2120939"	DERWENT USPAT; US-PGPUB; JPO;	2003/09/03 16:47
19	2	gb adj "2120939"	DERWENT USPAT; US-PGPUB; EPO; JPO;	2003/09/03 16:48
21	2	jp adj "2000095666"	DERWENT USPAT; US-PGPUB; EPO; JPO;	2003/09/03 16:49
22	2	"6200550" .pn.	DERWENT USPAT; US-PGPUB; EPO; JPO;	2003/09/03 16:50

23	2	jp adj "2000212066"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:51
24	2	"5532002" .pn.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:52
25	2	"5738871" .pn.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:53
26	0	"20000000186"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:53
27	4	"2000000186"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:53
28	0	"wo adj 2000000186"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:53
29	0	"wo adj 2000000186"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:54
30	1	au adj "9950871"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:56
31	0	wo adj "2002058689"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:56
32	1	"200258689"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:58
33	6	"6355684"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:58
34	4	"6348503"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/09/03 16:59
-	507	leukoplakia	USPAT; US-PGPUB	2003/09/03 13:46
-	320	leukoplakia and (cator or glycerol or linoleate)	USPAT; US-PGPUB	2003/09/03 13:47
-	322	leukoplakia and (castor or glycerol or linoleate)	USPAT; US-PGPUB	2003/09/03 13:47
-	132	(leukoplakia and (castor or glycerol or linoleate)) and (tocopherol or carotene)	USPAT; US-PGPUB	2003/09/03 14:24
-	1671	linoleate and glycerol	USPAT; US-PGPUB	2003/09/03 14:25
-	681	(linoleate and glycerol ) and castor	USPAT; US-PGPUB	2003/09/03 14:25
-	264	((linoleate and glycerol ) and castor) and surfactant	USPAT; US-PGPUB	2003/09/03 14:25
-	214	((linoleate and glycerol ) and castor) and tocopherol	USPAT; US-PGPUB	2003/09/03 14:25
-	56	((linoleate and glycerol ) and castor) and tocopherol) and carotene	USPAT; US-PGPUB	2003/09/03 14:27
-	4	((linoleate and glycerol ) and castor) and tocopherol) and carotene) and leukoplakia	USPAT; US-PGPUB	2003/09/03 16:07

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#### 4.2.1 Oral Cancer Epidemiology

Abstracts of thirty one articles are given in this section. These included case-control studies (conducted at Bangalore, Chennai (Madras), Thiruvananthapuram (Trivandrum), and Nagpur), case series, cross-sectional, and detection camp reports, two each of overviews of research, reviews and descriptive reports and a predictive study. Smoking, drinking, pan chewing (with or without tobacco) are all factors implicated in oral cancer.

OC Epi India (2002) Bal: Case-control study.

Balaram P, Sridhar H, Rajkumar T, Vaccarella S, Herrero R, Nandakumar A, Ravichandran K, Ramdas K, Sankaranarayanan R, Gajalakshmi V, Munoz N, Franceschi S. Oral cancer in southern India: the influence of smoking, drinking, paan-chewing and oral hygiene. *Int J Cancer* 2002 Mar 20;98(3):440-5.

(Regional Cancer Center, Trivandrum, Kerala, India.)

Between 1996 and 1999 we carried out a case-control study in 3 areas in Southern India (Bangalore, Madras and Trivandrum) including 591 incident cases of cancer of the oral cavity (282 women) and 582 hospital controls (290 women), frequency-matched with cases by age and gender. Odds ratios (ORs) and 95% confidence intervals (CIs) were obtained from unconditional multiple logistic regressions and adjusted for age, gender, center, education, chewing habit and (men only) smoking and drinking habits. Low educational attainment, occupation as a farmer or manual worker and various indicators of poor oral hygiene were associated with significantly increased risk. An OR of 2.5 (95% CI 1.4-4.4) was found in men for smoking > or = 20 bidi or equivalents versus 0/day. The OR for alcohol drinking was 2.2 (95% CI 1.4-3.3). The OR for paan chewing was more elevated among women (OR 4.2; 95% CI 2.4-7.6) than among men (OR 5.1; 95% CI 3.4-7.8). A similar OR was found among chewers of paan with (OR 6.1 in men and 4.6 in women) and without tobacco (OR 4.2 in men and 16.4 in women). Among men, 35% of oral cancer is attributable to the combination of smoking and alcohol drinking and 49% to pan-tobacco chewing. Among women, chewing and poor oral hygiene explained 95% of oral cancer. Copyright 2002 Wiley-Liss, Inc.

OC Epi India. (2002) Sha: Descriptive report

Sharma, D.C. Genetic Explanation for Oral Cancer in India. *Lancet Oncology*, 2002; 3 (7) 392.

Human papillomavirus (HPV) plays an important part in the development of oral cancer say a group of Indian scientists. They also suggest that the high rate of oral cancer seen in tobacco-addicted populations in eastern India may be partly the result of genetic factors. Their study, reported in the *International Journal of Cancer* (2002; 97:649-53), involved 110 Indian patients who were highly addicted to tobacco and had developed oral squamous-cell carcinoma. 33.6% of these patients had evidence of HPV infection far more than similar groups from other countries. Two earlier studies of oral cancer in India showed presence of HPV in 67% of cases in southern India and 15% cases in western India.

OC Epi India (2001) Mat: Case series

Mathew Iype E, Pandey M, Mathew A, Thomas G, Sebastian P, Krishnan Nair M. Squamous cell carcinoma of the tongue among young Indian adults. *Neoplasia* 2001 Jul-Aug;3(4):273-7.

(Division of Surgical Oncology, Regional Cancer Centre, Trivandrum, Kerala, 695001 India.)

Oral cancer is one of the commonest cancers among males in India. This study was carried out to evaluate the demographics, risk profile, clinicopathologic features, and treatment outcome in young patients with squamous cell carcinoma (SCC) of the tongue. Patients under the age of 35 years with SCC of the tongue presenting between 1982 and 1996 were identified using institutions centralized electronic database. Demographic, clinical, and pathologic characteristics were abstracted from the case records. Survival was calculated by Kaplan-Meier method. One hundred and fifteen patients with histologically confirmed SCC of the tongue were analyzed. The mean age at presentation was 30.5 years with a 1.7:1 male to female ratio. Prior exposure to tobacco and alcohol was noted in 58 (50.5%) patients. At presentation, 70 (60.9%) were in stages III and IV, and 59 (51.3%) patients had regional lymph node involvement. The overall disease-free survival (DFS) at 3 and 5 years were 63% and 54.9%, respectively. A statistically significant difference in DFS was seen between patients with N(0) and N(1) disease compared to N(2) or N(3) disease. Various other factors like age, sex, habits, and stage of the disease were found to have no significant effect on DFS. Results of the present study suggest that contrary to the belief, the survival among young patients is almost similar to that in older patients.

OC Epi India (2000) Doi: Cross-sectional survey.

Doifode VV, Ambadekar NN, Lanewar AG. Assessment of oral health status and its association with some epidemiological factors in population of Nagpur, India. *Indian J Med Sci* 2000 Jul;54(7):261-9.

(Indira Gandhi Medical College, Nagpur)

Present cross sectional study was undertaken in field practice area of Urban Health Training centre, Bapunagar, Nagpur to assess oral health status of community and to study the relationship of some epidemiological factors with it. Observations of the present study reveal that dental caries (43.2%) and periodontal diseases (34.8%) were the most common dental disorders. Other disorders were dentofacial anomaly (24.2%), opacities and enamel disorders (18.7%) and oral mucosal lesions (7.1%). Oral precancerous lesions (2.4%) also found to be an important problem. Prevalence of oral cancer was 0.1%. In general oral problems were more common in lower socioeconomic group and in habiters i.e. ghutka chewers, pan, tobacco eaters, candies eaters. Also use of tooth brush and tooth powder for cleaning teeth were found to be associated with lower prevalence of oro-dental disorders. Most of the problems were common in younger and middle aged population except cancer and precancerous lesions which were common in middle and older population. But oral submucous fibrosis was exclusively found in younger and middle aged subjects.

OC Epi India (1999) Gup: Predictive study.

Gupta PC. Mouth cancer in India: a new epidemic? *Indian Med Assoc* 1999 Sep;97(9):370-3

(Epidemiology Research Unit, Tata Institute of Fundamental Research, Mumbai)

Oral cancer has been traditionally described as a major form of cancer in India although on the basis of cancer registry data, it was thought that the incidence has decreased. There are several recent reports in the literature, however, predicting an increase in mouth cancer incidence in India. This prediction is based upon observation of an increasing prevalence of oral submucous fibrosis, especially in younger individuals, caused by gutka, an industrially manufactured food item. A comparison of the age distribution of recently reported oral submucous fibrosis cases and incident cases reported in the past clearly establishes that the disease is now occurring at much younger ages. A comparison of the age specific incidence rates of mouth cancer (ICD 143-5) during 1983-87 and 1995 in the city of Ahmedabad shows that the incidence has significantly increased in the younger population (< 50 years). Since tongue cancer (ICD 141) does not show a similar increase, it is concluded that the increase in mouth cancer incidence is real. Urgent public health measures are required to curb this new but avoidable epidemic.

OC Epi India (1999) Rao: Case-control study.

Rao DN, Desai PB, Ganesh B. Alcohol as an additional risk factor in laryngopharyngeal cancer in Mumbai--a case-control study. *Cancer Detect Prev* 1999;23(1):37-44.

(Division of Epidemiology and Biostatistics, Parel, Mumbai, India.)

A retrospective case-control study of 1698 male pharyngeal and laryngeal cancers seen at the Tata Memorial Hospital, Mumbai from 1980 to 1984 was undertaken to assess the association between the cancers and chewing, smoking, and alcohol habits. Male controls were chosen from persons who attended the hospital during the same period and who were diagnosed as free from cancer, benign tumor, and infectious disease. Statistical analysis was based on unconditional logistic regression method. Bidi smoking and alcohol drinking emerged as significant factors for pharyngeal and laryngeal cancers. Illiterates had 50 to 60% excess risk for pharyngeal cancer only. Nonvegetarian diet did not emerge as significant factor in our study.

OC Epi India (1998) Rao: Case-control study.

Rao DN, Desai PB. Risk assessment of tobacco, alcohol and diet in cancers of base tongue and oral tongue--a case control study. Indian J Cancer 1998 Jun;35(2):65-72.

(Division of Epidemiology and Biostatistics, Tata Memorial Hospital, Parel, Mumbai, India)

This is a retrospective case-control study of male tongue cancer patients seen at Tata Memorial Hospital, Bombay, during the years 1980-84. The purpose of the study was to identify the association of tobacco, alcohol, diet and literacy status with respect to cancers of two sub sites of tongue namely anterior portion of the tongue (AT) (ICD 1411-1414) and base of the tongue (BT) (ICD 1410). There were 142 male AT patients and 495 BT patients interviewed during the period. 635 interviewed male patients who were free of any disease were considered as control. Bidi smoking was found to be a significant risk factor for BT patients and tobacco chewing for AT patients respectively. Alcohol drinkers showed about 45% to 79% excess risk for both sites of tongue cancer. Illiteracy and non vegetarian diet proved to be a significant factor for AT patients only. The study brings out that the location of cancer has got a direct bearing with the type of tobacco use and other related habits and this inturn may provide meaningful interpretation of variations observed in the incidence of tongue cancer around the world.

OC Epi India (1997) Datta: Case-control study.

Datta K, Saha RK, Chakrabarti RN. A simple risk estimates study for oral cavity cancer: practical approach in Indian context. J Indian Med Assoc 1997 Mar;95(3):70-1.

(Chittaranjan National Cancer Institute, Calcutta)

A study was conducted on 131 cases of oral cavity cancer (OCC), 145 cases of oral leucoplakia and 704 subjects without any oral lesions to investigate risk factors associated with the development of carcinoma of oral cavity in a hospital based cancer registry. Personal interviews, as well as physical examinations of the subjects enabled evaluation of a variety of potential risk factors. Potential risk factors like tobacco chewing, tobacco smoking, snuff dipping, alcohol consumption, bad oral and dental hygiene and age were given each certain numerical values. Each subject was first given a scoring and then analysed and correlated with the presenting lesions, when present. The study revealed that tobacco chewing and bad oral and dental hygiene contributed mainly to higher scoring. Among the subjects in high risk group (scoring more than 400) 63% had OCC, 21% had oral leucoplakia and 16% had no clinical oral lesions. Among the medium risk group (scoring between 100 and 400) 6% had OCC, 21% had leucoplakia and 73% had no oral lesions. In low risk group (scoring below 100) 8% had leucoplakia and 92% had no clinical oral lesions. Using the scoring system, it is suggested that the high risk group for OCC could be identified from general population and cancer detection tests could be specially directed towards this target group to detect maximum number of cases with minimum possible resources.

OC Epi India (1996) Gho: Case-control study.

Ghosh S, Shukla HS, Mohapatra SC, Shukla PK. Keeping chewing tobacco in the cheek pouch overnight (night quid) Increases risk of cheek carcinoma. Eur J Surg Oncol 1996 Aug;22(4):359-60.

(Department of Surgery, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India)

Chewing Chewable Indian Tobacco (CIT) is a popular addiction in India. Some of the addicts keep the bolus of chewed tobacco tucked in the gingivo-labial sulcus (cheek pouch) overnight. This is known as the habit of the night quid. To assess the influence of night quid on the development of oral cancer we carried out this case control observational study in the Out Patient Department of Surgery, Sir Sunder Lai Hospital, Varanasi, India. A

total of 105 consecutive oral cancer patients (epidermoid carcinoma) and 71 sex- and age-matched CIT addicts of the same duration of addiction were investigated for the habit of the night quid. The habit increased the risk of development of cheek carcinoma significantly at Odd's Ratio of 12.5. Simply giving up the habit of night quid could help in the reduction of oral cancer in CIT addicts.

OC Epi India (1996) Gup: Case-control study.

Gupta PC, Murti PR, Bhonsle RB. Epidemiology of cancer by tobacco products and the significance of TSNA. Crit Rev Toxicol 1996;26(2):183-98.

(International Agency for Research on Cancer, Lyon)

Globally, oral cancer is one of the ten common cancers. In some parts of the world, including the Indian subcontinent, oral cancer is a major cancer problem. Tobacco use is the most important risk factor for oral cancer. The most common form of tobacco use, cigarette smoking, demonstrates a very high relative risk--in a recent cohort study (CPS II), even higher than lung cancer. In areas where tobacco is used in a smokeless form, oral cancer incidence is generally high. In the West, especially in the U.S. and Scandinavia, smokeless tobacco use consists of oral use of snuff. In Central, South, and Southeast Asia smokeless tobacco use encompasses nass, naswar, khaini, mawa, mishri, gudakhu, and betel quid. In India tobacco is smoked in many ways; the most common is bidi, others being chutta, including reverse smoking, hooka, and clay pipe. A voluminous body of research data implicating most of these forms of tobacco use emanates from the Indian subcontinent. These studies encompass case and case-series reports, and case-control, cohort, and intervention studies. Collectively, the evidence fulfills the epidemiological criteria of causality: strength, consistency, temporality, and coherence. The biological plausibility is provided by the identification of several carcinogens in tobacco, the most abundant and strongest being tobacco-specific N-nitrosamines such as N-nitrosornicotine (NNN) and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). These are formed by N-nitrosation of nicotine, the major alkaloid responsible for addiction to tobacco. The etiological relationship between tobacco use and oral cancer has provided us with a comprehensive model for understanding carcinogenesis.

OC Epi India (1996) Nan: Case-control study.

Nandakumar A, Anantha N, Pattabhiraman V, Prabhakaran PS, Dhar M, Puttaswamy K, Venugopal TC, Reddy NM, Rajanna, Vinutha AT, Srinivas. Importance of anatomical subsite in correlating risk factors in cancer of the oesophagus--report of a case--control study. Br J Cancer 1996 May;73(10):1306-11.

(National Cancer Registry Programme (Indian Council of Medical Research), Kidwai Memorial Institute of Oncology, Bangalore, India.)

In Bangalore, cancer of the oesophagus is the third most common cancer in males and fourth most common in females with average annual age-adjusted incidence rates of 8.2 and 8.9 per 100,000 respectively. A case-control investigation of cancer of the oesophagus was conducted based on the Population-based cancer registry, Bangalore, India. Three hundred and forty-three cases of cancer of the oesophagus were age and sex matched with twice the number of controls from the same area, but with no evidence of cancer. Chewing with or without tobacco was a significant risk factor. In both sexes chewing was not a risk factor for cancer of the upper third of the oesophagus. Among males, non-tobacco chewing was a significant risk factor for the middle third but not for the other two segments and tobacco chewing was a significant risk factor for the lower third of the oesophagus, but not for the other two segments. Bidi smoking in males was a significant risk factor for all three segments being highest for the upper third, less for the middle third and still less for the lower third. The risk of oesophageal cancer associated with alcohol drinking was significant only for the middle third.

OC Epi India (1994) Aga: Camp report.

Agrawal RC, Saxena AK, Srivastava SM, Sahay S. Early detection and prevention of oral cancers. In: Oral Oncology Volume III A Research. Ed. Verma AK. 3rd International Congress on Oral Cancer, Madras. MacMillan India, Bangalore, 1994, pp 53-55.

(Cancer Hospital and Research Institute, Gwalior, India)

In this study effort has been made to detect the cancer cases in early stage of the disease through cancer detection camps. The methodology of the study included organising camps in rural and urban areas for mass screening of the population, on the spot cancer detection, suggesting preventive measures and referring the

suspected cases requiring detailed examination to cancer hospitals. Of the total 9624 patients, 1192 were found suspicious of having cancer. But despite up to three follow-up visits per suspected case, only 329 of these patients reported to hospital and out of them 92 were found suspicious cases. A positive correlation between use of tobacco and incidence of oral cancer was reported.

OC Epi India (1994) Des: Case-control study.

Deshmukh PT, Raizada RM, Chaturvedi VN. Epidemiological study of Oral Premalignant lesions in 3460 rural inhabitants of Maharashtra State. In: Oral Oncology Volume III A Research. Ed. Verma AK. 3rd International Congress on Oral Cancer, Madras. MacMillan India, Bangalore, 1994, pp 44-46.

(JNMC, Savangi, Meghe, MGIMS, Sewagram, Maharashtra)

Objective: To study the prevalence of oral precancerous lesions and various habits influencing their causation in rural inhabitants. Methods: Screening of 3460 subjects regarding their personal habits smoking, chewing and teeth biting was done. They were then examined for precancerous lesions, recording their site, size, number and anatomical location. Data was then statistically analysed. Results: Prevalence of precancerous lesions was found to be 21.9/1000 which included melanoplakia, leukoplakia and Oral Submucous Fibrosis (OSMF). Out of 254 individuals who used to take tobacco, 17 precancerous lesions were found, whereas 36 with lesions among 618 individuals taking tobacco and lime together were noted. A clear cut dose-response relationship of tobacco chewing was observed in all types of lesions.

OC Epi India (1994) Rao: Case-control study.

Rao DN, Ganesh B, Rao RS, Desai PB. Risk assessment of tobacco, alcohol and diet in oral cancer--a case-control study. Int J Cancer 1994 Aug 15;58(4):469-73.

(Division of Epidemiology and Biostatistics, Tata Memorial Hospital, Parel, Bombay, India.)

A retrospective case-control study of 713 male oral-cancer patients seen at Tata Memorial Hospital, Bombay, during 1980-1984 was undertaken to assess the association between chewing, smoking and alcohol habits. Male controls were chosen among those persons who attended the hospital during the same period and were diagnosed as free from cancer, benign tumour and infectious disease. Statistical analysis was based on unconditional logistic regression and the confidence interval for RR was calculated using the standard error of the estimates. Established factors such as tobacco chewing and bidi smoking showed a significant association with oral cancer. For the alcohol habit, the relative risk was 1.42 and the dose-response relationship, in terms of frequency and duration of the habit, was also observed. The illiterate group showed an almost 2-fold significant excess risk compared to the literate group. After adjusting for confounding variables such as age, residence, illiteracy and known factors such as tobacco chewing and bidi smoking, the study has brought out the significance of a non-vegetarian diet as a high-risk factor for oral cancer compared to a vegetarian diet. Further studies are required to identify specific items in the non-vegetarian diet which may be associated with oral cancer.

OC Epi India (1993) van: Cross-sectional study.

van der Eb MM, Leyten EM, Gavarasana S, Vandenbroucke JP, Kahn PM, Cleton FJ. Reverse smoking as a risk factor for palatal cancer: a cross-sectional study in rural Andhra Pradesh, India. Int J Cancer 1993 Jul 9;54(5):754-8.

(Department of Clinical Oncology, University Hospital Leiden, The Netherlands.)

A cross-sectional study of reverse smoking and its association with pre-malignant and malignant lesions of the palate was conducted in the north coastal areas of Andhra Pradesh, India. A total of 480 randomly selected persons were interviewed. Information about smoking status, diet and access to mass media was obtained in each case and an examination of the oral cavity was performed. Reverse smoking of chutta was practised by 33% of the total rural population. The prevalence rate of all palatal lesions was 55%. The prevalence rates of the separate lesions: leukoplakia palatii, palatal keratosis and palatal cancer, were 9.8%, 18.1% and 1.9%, respectively. The presence of these (pre-)malignant lesions was strongly associated with reverse smoking and also associated with conventional chutta smoking. Reverse smoking induced significantly more lesions than conventional chutta smoking, and was a major determinant of subsequent palatal cancer: all 9 newly diagnosed palatal cancers were observed within the group of reverse smokers. There was an inverse relationship between

the incidence of palatal lesions and vitamin A intake. The study of access to mass media indicated that the most favourable medium for promoting a prevention campaign would be the cinema.

OC Epi India (1992) Daf: Cohort study.

Daftary DK, Murti PR and Shah HT. Reverse chutta smoking and palatal lesions. In: Gupta PC, Hamner JE III, Murti PR, eds. Control of Tobacco-related Cancers and Other Diseases. Proceedings of an International Symposium, TIFR, Bombay, January 15-19, 1990. Oxford University Press, Bombay, 1992, pp 85-90.

(Basic Dental Research Unit and WHO Collaborating center for Oral Cancer Prevention, Tata Institute of Fundamental Research, Bombay, India)

In Srikakulam district, Andhra Pradesh, India, chutta is often smoked with the lighted end inside the mouth. This habit is responsible for the high incidence of palatal cancer and for specific palatal changes. Palatal changes are precancerous, and they include several components, such as keratosis, excrescences, patches, red areas, ulcerations and non-pigmented areas. Red areas appear to be the most dangerous and histologically: 52% of them exhibit epithelial dysplasia. Over a 10-year period, 10 palatal cancers arose, all from pre-existing palatal changes; malignant transformation occurred only in red areas and patches. During same period, 75% of the palatal changes remained stationary and 14% regressed spontaneously. Cessation of the habit led to higher regression rates of palatal changes, and currently this appears to be the most effective method for managing palatal changes.

OC Epi India (1992) Jay: Cohort study.

Jayant K and Yeole BB. Tobacco-related cancers in Bombay, India: a study of incidence over two decades. In: Gupta PC, Hamner JE III, Murti PR, eds. Control of Tobacco-related Cancers and Other Diseases. Proceedings of an International Symposium, TIFR, Bombay, January 15-19, 1990. Oxford University Press, Bombay, 1992, pp 139-147.

(Cancer Research Institute, Bombay, India; and \*Bombay Cancer Registry, Bombay, India)

A study of the site-specific incidence rates of cancers of the upper alimentary and respiratory tracts over two decades among males in Bombay showed that the incidence of cancers of the tongue, oropharynx and larynx have decreased significantly, whereas that of oral cancer excluding the tongue has remained more or less stable. The incidences of cancers of the hypopharynx oesophagus and lung increased only marginally, but successive birth cohorts showed no consistent pattern. Limited data on tobacco habits in Bombay indicate a marked decrease in the proportion of bidi smokers in younger cohorts, which conforms with the observed decline in the incidence of those cancers for which bidi smoking is the predominant risk factor. For cancers of the hypopharynx, oesophagus and lung, for which tobacco chewing or cigarette smoking is an equally or more important risk factor than bidi smoking, no consistent pattern was seen. Tobacco-related cancers constitute about 50% of cancers among men in India. As the recent national trends in per-caput consumption of tobacco are different from those in Bombay, the decline in predominantly bidi dependent cancers seen in Bombay cannot be extrapolated to the country as a whole. Consequently, control programmes are needed for all smokers in the country, and especially for cigarette smokers in urban areas.

OC Epi India (1992) Kur: Case series study.

Kuriakose M, Sankaranarayanan M, Nair MK, Cherian T, Sugar AW, Scully C, Prime SS. Comparison of oral squamous cell carcinoma in younger and older patients in India. Eur J Cancer B Oral Oncol 1992 Oct; 28B (2):113-20.

(Department of Oral Medicine, Surgery and Pathology, Bristol Dental Hospital and School, U.K)

This study examines the demographic, aetiological and clinico-pathological features of 37 patients with oral squamous cell carcinoma (SCC) who were less than 35 years old and a comparable number of patients who were greater than 60 years old. The study was undertaken at the Regional Cancer Centre, Trivandrum, India, between 1988 and 1990. In patients younger than 35 years old, oral SCC occurred more commonly in females, was apparent in all social classes and was associated with fewer aetiological factors. The tumours manifested predominantly as invasive lesions affecting the tongue and there was early spread to lymph nodes. By contrast, in patients older than 60 years of age, oral SCC was more common in males, occurred more frequently in social classes III and IV and was always seen in association with smoking, alcohol or pan chewing. These latter



tumours presented as exophytic lesions of the buccal mucosa or gingivae and spread late to lymph nodes. The results indicate that the biological behaviour of oral SCC in young patients may be distinct from that occurring in older patients.

OC Epi India (1992) Meh: Overview.

Mehta FS. An overview of research on oral cancer and precancer at the Basic Dental Research Unit. In: Gupta PC, Hamner JE III, Murti PR, eds. Control of Tobacco-related Cancers and Other Diseases. Proceedings of an International Symposium, TIFR, Bombay, January 15-19, 1990. Oxford University Press, Bombay, 1992, pp 79-84.

(Basic Dental Research Unit and WHO Collaborating center for Oral Cancer Prevention, Tata Institute of Fundamental Research, Bombay, India)

Since 1966 the Basic Dental Research Unit has undertaken extensive epidemiological studies on oral cancer and precancer in seven areas of India and among Bombay policemen. Using a house-to-house approach, the tobacco habits of well over 200 000 villagers were recorded by trained interviewers. Cross-sectional studies were then carried out in which these individuals were examined by dentists for the presence of oral cancer and precancerous lesions, and about 66 000 of the villagers in four cohorts were re-examined annually over 10 years. All oral lesions were photographed in colour, and several hundred biopsies and smears for cytological examination were obtained from the lesions. Oral cancer and precancerous lesions were strongly associated with tobacco use, and in most instances the oral cancer originated from precancer. It was also demonstrated that it is possible to make people quit their tobacco habits, thereby leading to a decreased incidence of precancer. Several other strategies for the control of oral cancer were tried, such as using basic health workers for primary and secondary prevention and mouth self-examination techniques for early detection; these are being further investigated.

OC Epi India (1992) Mur: Overview.

Murti PR, Bhonsle RB, Gupta PC and Daftary DK. Oral health consequences of tobacco use in Ernakulam district, Kerala, India. In: Gupta PC, Hamner JE III, Murti PR, eds. Control of Tobacco-related Cancers and Other Diseases. Proceedings of an International Symposium, TIFR, Bombay, January 15-19, 1990. Oxford University Press, Bombay, 1992, pp 91-105.

(Basic Dental Research Unit and WHO Collaborating center for Oral Cancer Prevention, Tata Institute of Fundamental Research, Bombay, India)

Bidi smoking and betel-quid (pan) chewing are the most common forms of tobacco use in Ernakulam district. They are strongly associated with oral cancer, various precancerous lesions and conditions, and others which do not seem precancerous. Nodular leukoplakia and submucous fibrosis are a very high-risk precancerous lesion and condition, respectively; other clinical types of leukoplakia also indicate a significant risk for oral cancer. Malignant transformation was not associated with leukoedema, **leukokeratosis** nicotina palati, palatal erythema, central papillary atrophy of the tongue, pan-chewer's lesion or oral lichen planus-like lesion. Most of these oral lesions remained stationary, some regressed and few recurred; submucous fibrosis, however, did not regress. Overall tobacco use was found to influence the entire natural history of precancer, indicating the need to implement tobacco control measures.

OC Epi India (1992) Not: Overview.

Notani PN. Role of diet and alcohol in tobacco-related cancer at sites in the upper aerodigestive tract in an Indian population. In: Gupta PC, Hamner JE III, Murti PR, eds. Control of Tobacco-related Cancers and Other Diseases. Proceedings of an International Symposium, TIFR, Bombay, January 15-19, 1990. Oxford University Press, Bombay, 1992, pp 149-155.

(Epidemiology Unit, Cancer Research Institute, Tata Memorial Centre, Bombay, India)

Cancers of the upper alimentary and respiratory tracts, for which tobacco is the major cause, constitute about one-third of all cancers among Indians. Probable changes in demography suggest that the incidence of these cancers will increase. Since a large segment of tobacco users remain cancer free, however, other factors may have a modifying effect on the risk of developing the disease. The modifying effect of diet on the occurrence of oral cancer was observed in an exploratory study in India in early 1970s. Subsequently, the role of various dietary factors and of alcohol were studied for cancers of all sites in the upper aerodigestive tract. The results

indicate that intake of vegetables, fish and buttermilk (liquefied yougurt) was associated with a lower risk for upper aerodigestive tract cancers and that use of red chillie powder, a common spice used in Indian food, was a risk factor in a dose-dependent manner. Alcohol intake had a limited but significant influence on the risk for these cancers.

OC Epi India (1992) San: Overview.

Sankaranarayanan R, Nair MK, Mathew B, Balaram P, Sebastian P, Dutt SC. Recent results of oral cancer research in Kerala, India. Head Neck 1992 Mar-Apr;14(2):107-12.

(Department of Radiotherapy, Regional Cancer Centre, Trivandrum, India)

Findings from a research program in oral cancer at Regional Cancer Centre, Trivandrum, Kerala, India are reviewed. There is evidence of immune impairment in oral cancer patients. Plant lectins are being investigated for specific binding characteristics in various oral precancers and different histological subtypes of oral cancer. Tobacco and alcohol have been identified as the major risk factors for oral cancer. The chemopreventive potential of carotenoids and retinoids have been evaluated in oral leucoplakias. **Beta-carotene** and vitamin A in heavier doses induced remission of oral leukoplakias in 25%-50% of trial participants who continued with their tobacco and alcohol habits during the trial. The remission could be maintained with lower doses. Less than 20% of our patients with oral cancer were initially seen in localized stages. Various community-oriented programs for prevention of primary and secondary oral cancers are being evaluated. These include anti-tobacco health education, oral self-examination, and oral examination by trained volunteers. The results of radical radiotherapy and surgical salvage of radiation failure are also discussed. The 5-year disease-free survival rate of 34% is a reflection of the advanced stages of the disease when initially seen. Salvage rates with surgery for radiation failures were encouraging.

OC Epi India (1992) Sin: Overview.

Sinor PN, Murti PR, Bhonsle RB and Gupta PC. Mawa chewing and oral submucous fibrosis in Bhavnagar, Gujarat, India. In: Gupta PC, Hamner JE III, Murti PR, eds. Control of Tobacco-related Cancers and Other Diseases. Proceedings of an International Symposium, TIFR, Bombay, January 15-19, 1990. Oxford University Press, Bombay, 1992, pp 107-112.

(Basic Dental Research Unit and WHO Collaborating center for Oral Cancer Prevention, Tata Institute of Fundamental Research, Bombay, India)

Mawa is an areca-nut preparation containing tobacco and lime. Its use is very popular among the youth in Bhavnagar. Recently, there has been an increased occurrence of submucous fibrosis in this area. A case-control study on submucous fibrosis in Bhavnagar showed a relative risk of 109.6 for all forms of areca-nut use, 106.4 for mawa chewing and 780.0 for chewing mawa as well as betel quid (pan). The relative risks increased with the increase in the duration and frequency of areca nut chewing; a bivariate analysis also showed a multiplicative effect. Clinically, submucous fibrosis in Bhavnagar differed in regard to age, sex and location distribution from cases in Ernakulam. These variations could be due to the differences in the types of areca-nut chewing in these areas - mawa chewing in Bhavnagar and betel-quid chewing Ernakulam. The findings raise several research questions and indicate a need for public health measures against areca-nut containing products.

OC Epi India (1991) Akh: Case-control study.

Akhileswaran R, Vidyasagar MS, Rao KK, Kasturi DP, Fernandes DJ, Naseer CH. Analysis of habits in oral cancer in Rural South India. In: Oral oncology Volume II Ed. Verma AK. International Congress on Oral Cancer. Macmillan India, Bangalore, 1991, pp 35-38.

(Kasturba Medical College and Hospital-Manipal)

In this case-control study, 200 cases of histologically confirmed oral cancer were studied in relation to stage of disease, site, histology and residual disease after primary treatment, with duration of tobacco and related habits. All 200 had habits of pan, tobacco chewing or smoking and some drank alcohol too. These cases were divided in 3 groups depending on the duration of tobacco and related habits.

Almost 90% of the patients had tobacco related habits of 20 or more years duration. The number of habit-years

seems to affect the disease process. Most of the oral cancers presented with stage III or stage IV disease. Thus intervention and educative programmes are needed to decrease the prevalence of OC.

OC Epi India (1991) Bho: Overview.

Bhowate RR, Jawle SS, Rao SP, Pakhan AJ, Chinchkhede DH. Epidemiology of oral premalignant lesions in rural areas of Wardha District. In: Oral oncology, Volume II, Ed. Verma AK. International Congress on Oral Cancer, Madras. Macmillan India, Bangalore, 1991, pp 24-27.

(Department of Dental Surgery, MGIMS, Sevagram, Maharashtra)

Objective: To find out the prevalence of oral premalignant lesions among habitual tobacco users. Methods: A community survey of 2000 persons of all ages was conducted in the rural field practice area of the Department of Community Medicine MGIMS, Sevagram, taking a detailed history of tobacco consumption and performing oral examination. Results: Out of a total of 2000 individuals examined, 437 individuals were habituated to tobacco. Two thirds of them were males and most were between the ages of 20-39 years (43.9%). This was also the group among whom most of the premalignant lesions and conditions were found. Three of the habitués were below the age of nine years. Amongst users, 73.4% were consuming tobacco with lime, 13.5 % were chewing betel nut or pan without tobacco, 7.7% were taking tobacco with betel nut and/or pan, while 5.2% had smoking as the predominant habit. As many as 52.4% of habitués to tobacco/pan/betel nut were found to be suffering from oral lesions. No lesions were found among non-users. Tobacco-lime users had a higher proportion of leukoplakia than those with other habits. A dose response relationship was found with increasing amounts of tobacco consumed per day. Conclusion: This study confirms the necessity of oral health surveys in high-risk groups like adolescents and young adults to detect early premalignant lesions.

OC Epi, India (1991) Hai: Camp report.

Hai AA, Sinha DN, Hussain SN, Mittal V. Cancer Detection camp-The Patna Experience. In: Oral oncology Volume II Ed. Verma AK. International Congress on Oral Cancer. Macmillan India, Bangalore, 1991, pp 16-19.

(Department of surgery, Patna medical college Patna, India)

Two small cancer detection were organized in vicinity of Patna. Forty-six percent of the population screened was addicted to tobacco (43% in camp 1 and 47.8% in Camp 2) In Camp 1 the college going students were the most common users of Khaini. In Camp 1 and 2 respectively, 11 and 35 had premalignant changes (mainly leukoplakia). In Camp 1 all the cases with leukoplakia had a history of addiction. Seven cases (1.5%) out of all the persons examined in the camps had frank malignancy. Of these malignancies 6 were Khaini users, most of whom had used khaini for more than 10 years. The longest duration of khaini addiction in one individual was 28 years and he had developed frank malignancy over last one year. Another finding was of poor dental hygiene. Conclusions drawn from the experience were that tobacco plays the most significant role in the aetiology of oral cancers and the risk of cancer seems to be dose and duration related. A population-based study in the area was recommended

OC Epi, India (1991) Ram: Case series study.

Ramesh V, Srinivasan B. Verrucous Carcinoma - An epidemiological study. In: Oral oncology Volume II Ed. Verma AK. International Congress on Oral Cancer. Macmillan India, Bangalore, 1991, pp 13-15.

Fifteen cases of verrucous carcinoma detected out of 50,000 out-patients (0.03%) between 1988 and 1991 at the Raja Muthaiah Dental College and Hospital, Annamalai University, South India, were reviewed. The occurrence of squamous cell carcinoma and verrucous carcinoma in the oral cavity was in the ratio of 5:1. Verrucous carcinomas were seen in the age groups of 35 to 75 years with an average age of 54 years, mostly in males. The average age for squamous cell carcinoma was 63 years. In two cases, verrucous carcinoma transformed in to squamous cell carcinoma. One case exhibited a coexistent lesion of submucous fibrosis. All the patients with verrucous carcinoma gave a history of tobacco chewing with placement of the quid in the cheek mucosa, the predominant site of verrucous carcinoma.

OC Epi India (1991) Siv: Camp report.

Sivakumar M, Ravivarma NA, Ramankutty P. An epidemiologic study of Oral Cancer in South Kanara, Karnataka India. In: Oral oncology Volume II Ed. Verma AK. International Congress on Oral Cancer. Macmillan India, Bangalore, 1991, pp 16-19.

(Dept. of Community Dentistry KMC Manipal India)

The objective of this study was to determine the prevalence of oral cancer and precancerous lesions among people and to study the role of habits like tobacco chewing, smoking and alcohol consumption among people in the etiopathogenesis of oral cancer. Health camps were conducted in 7 villages in 4 taluks in south Kanara. A total of 12,033 individuals attended the camp. All those persons with lesions in the oral cavity underwent histopathological examination. Of the 4011 subjects aged 20 to 80 years screened for detection of oral cancer, 2031 were males and 1980 were females. Among them 77.6% of males and 54.4% of females had either one or more habits like chewing, smoking and alcoholism. There were 8 cases of oral cancer of which 6 were females and 2 were males. The prevalence rate of oral cancer was 2 per 1000. This study revealed that the chewing of tobacco habit is predominant in this region and 7 of the 8 cases of oral cancer had chewing habits as a common factor. This fact emphasises the need to undertake preventive measures to control oral cancer in the community in this part of the country.

OC Epi India (1991) Tul: Descriptive report.

Tuli SN, Kapoor HL. Mouth Cancer in Himachal Pradesh. In: Oral oncology Volume II Ed. Verma AK. International Congress on Oral Cancer. Macmillan India, Bangalore, 1991, pp 9-12.

Oral cancers constitute 4.6% of total cancer cases in the State of Himachal Pradesh (Northern India). Males are more affected than females in the ratio of 1.6: 1. The main etiological factors include smoking, tobacco chewing, constant irritation, caries in teeth, oral sepsis, ill-fitting dentures and faulty restorations, as seen in most other parts of India. More emphasis has to be laid on avoidance of tobacco habits, which are largely responsible for causing oral cancer. The authors conclude that oral cancer is not a major problem in the state of Himachal Pradesh, compared to most other states of Indian sub-continent, mainly due to absence of tobacco chewing in the State.

OC Epi India (1990) Gou: Case-control study.

Goud ML, Mohapatra SC, Mohapatra P, Gaur SD, Pant GC, Knanna MN. Epidemiological correlates between consumption of Indian chewing tobacco and oral cancer. Eur J Epidemiol 1990 Jun;6(2):219-22.

(Department of Social and Preventive Medicine, Warangle Medical College, Andhra Pradesh, India)

The problem of cancer is universal; the only variation occurs in the type, site or other clinicoepidemiological parameters. Peculiarly enough, oral cancers caused by chewing tobacco are common in India and some parts of the Indian sub-continent. Oral cancers caused by other carcinogens are not common in these areas. The present study shows a significant association (P less than 0.001) between the use of Indian chewing tobacco and oral cancer. Number of quids, mean quantity of tobacco and mean duration of keeping the quids in the mouth had direct dose and effect relationships in causation of oral cancer. A dose of 10 gms of chewing tobacco for about 26 years was observed to have produced cancerous lesions in the buccal cavity. Comment in: Eur J Epidemiol. 1991 Jan;7(1):93-7.

OC Epi India (1990) Nan: Case-control study.

Nandakumar A, Thimmasetty KT, Sreeramareddy NM, Venugopal TC, Rajanna, Vinutha AT, Srinivas, Bhargava MK. A population-based case-control investigation on cancers of the oral cavity in Bangalore, India. Br J Cancer 1990 Nov;62(5):847-51.

(Department of Population Based Cancer Registry, Kidwai Memorial Institute of Oncology, Bangalore, India.)

A case-control study on cancers of the oral cavity was conducted by utilising data from the population based cancer registry. Bangalore, India. Three hundred and forty-eight cases of cancers of the oral cavity (excluding base tongue) were age and sex matched with controls from the same residential area but with no evidence of cancer. The relative risk due to pan tobacco chewing was elevated in both males and females, being appreciably higher in the latter (relative risk 25.3%; 95% confidence interval 11.2-57.3). A statistically significant (linear test for trend P less than 0.001) dose response based on years, times per day and period of time chewed was seen. Any smoking (cigarette or bidi or both) had only slightly elevated risk of developing oral cancer, whereas a history of alcohol drinking or inhalation of snuff did not influence the risk. A new finding of our study was the markedly elevated risk of oral cancer in persons consuming ragi (Eleusine coracana, family gramineae) in comparison to those not consuming ragi as staple cereal in their diet. There also appeared to be some

interaction between ragi consumption and tobacco chewing with substantially higher relative risks in those who pursued both habits compared to those who gave a history of either.

OC Epi India (1990) San: Case-control study.

Sankaranarayanan R. Oral cancer in India: an epidemiologic and clinical review. *Oral Surg Oral Med Oral Pathol* 1990 Mar;69(3):325-30.

(Regional Cancer Centre, Kerala, India)

This article reviews the epidemiologic and clinical aspects of oral cancer in India, where the disease ranks number one among all cancers in male patients and number three among cancers in female patients. Causal association between oral cancer and the chewing of betel quids containing tobacco leaves or stem and other tobacco habits has been extensively studied. But there is need for more in-depth studies on the role of alcohol, diet, and oral hygiene practices in India. The exciting opportunity provided by the well-established oral precancerous lesions for intervention and early detection programs is also discussed. The peak age frequency of occurrence is at least a decade earlier than that described in Western literature. Sex ratio reveals a 2:1 preponderance of male patients. Only 10% to 15% of cases present in localized stages. The poor survival revealed by existing studies is mainly due to the overwhelming proportion of advanced cases. The excellent opportunity for more research and efforts in prevention and control of oral cancer in India is highlighted in this review.

OC Epi India (1990) San: Case-control study.

Sankaranarayanan R, Duffy SW, Padmakumary G, Day NE, Nair MK. Risk factors for cancer of the buccal and labial mucosa in Kerala, southern India. *J Epidemiol Community Health* 1990 Dec;44(4):286-92.

(Regional Cancer Centre, Trivandrum-India)

**STUDY OBJECTIVE**--The aim was to investigate risk factors for cancer of the buccal and labial mucosa in Kerala, southern India. **DESIGN**--The investigation was a case-control study. **SETTING**--Regional Cancer Centre, Trivandrum, Kerala, and local teaching hospitals. **PARTICIPANTS**--Cases were all those registered with oral cancers at the Regional Cancer Centre during 1983 and 1984 (n = 414). Controls (n = 895) were selected from admissions to the cancer centre who were found to have non-malignant conditions, or from patients attending outpatients in teaching hospitals of Trivandrum medical college with non-malignant conditions. **MEASUREMENTS AND MAIN RESULTS**--The risk in males of the following habits was investigated: pan (betel)-tobacco chewing, bidi and cigarette smoking, drinking alcohol, and taking snuff. Only pan-tobacco chewing was investigated in females as very few indulged in other habits. Among males predisposing effects were found for pan-tobacco chewing (p less than 0.001), bidi smoking (p less than 0.001), drinking alcohol (p less than 0.001), and taking snuff (p less than 0.01). As in males, pan-tobacco chewing also had a predisposing effect in females (p less than 0.001). Duration of use was a better predictor of risk than either daily frequency of use or total lifetime exposure, both for pan-tobacco chewing (especially if the habit started before age 21 years) and bidi smoking. However, there were also very high risks associated with the current occasional use of both factors. Pan-tobacco chewing was the most important risk factor, with relative risk of 13.24 with 31-40 years' use, and 37.75 with greater than 40 years' use among males. Corresponding relative risks in females were 21.30 and 54.93. No effect of cigarette smoking was observed (relative risk 0.64, p greater than 0.1). **CONCLUSIONS**--A substantial majority of cases of buccal and labial cancers are attributable to chewing pan-tobacco. This has obvious implications for instituting preventive measures.

OC Epi India (1989) Cha: Case series study.

Chattopadhyay A. Epidemiologic study of oral cancer in eastern India. *Indian J Dermatol* 1989 Sep;34(3):59-65.

From January 1967 to December 1987, 732 consecutive cases of oral squamous cell carcinoma were analysed at a Dental College and Hospital in Calcutta. Incidence of oral cancer was 47.73 per 100,000. Male: Female ratio was 1.76. Mean age was 52.07 years. Buccal mucosa was the commonest site involved, next was gingiva and alveolar ridge. Tobacco chewing, smoking and pan chewing were the deleterious habits which were significantly more common among the affected group compared to the control group.

OC Epi India (1989) Gup: Case-control study.

Gupta PC, Bhonsle RB, Murti PR, Daftary DK, Mehta FS, Pindborg JJ. An epidemiologic assessment of cancer risk in oral precancerous lesions in India with special reference to nodular leukoplakia. *Cancer* 1989 Jun 1;63(11):2247-52.

(Basic Dental Research Unit, Tata Institute of Fundamental Research, Bombay, India)

A cohort of 12,212 tobacco users was followed up annually to assess malignant potential of oral precancerous lesions in the Ernakulam district in Kerala, India. A total of 19 new oral cancers were diagnosed over a period of 8 years, and 15 (79%) of these arose from some preexisting precancerous lesion or condition. Nodular leukoplakia showed highest rate of malignant transformation (16% per year) as six of 13 nodular leukoplakia underwent malignant transformation over a mean follow-up period of 2.8 years. The relative risk (3243.2) compared with individuals with tobacco habits but without any precancerous oral lesion was also the highest for nodular leukoplakia. In addition, nodular leukoplakia was associated with submucous fibrosis in two patients, which progressed to oral cancer and was the clinical diagnosis for four lesions that turned out to be malignant on histopathologic examination. Nodular appearance was noted in two other precursor lesions as well. Thus, 14 of 19 oral cancers (74%) were either preceded by nodular leukoplakia and with lesions showing a distinct nodular appearance, or had the clinical appearance of nodular leukoplakia.

OC Epi India (1989) Meh: Case-control study.

Mehta FS, Bhonsle RB, Murti PR, Daftary DK, Gupta PC, Pindborg JJ. Central papillary atrophy of the tongue among bidi smokers in India: a 10-year study of 182 lesions. *J Oral Pathol Med* 1989 Sep;18(8):475-80.

(Basic Dental Research Unit, Tata Institute of Fundamental Research, Bombay, India)

The occurrence of central papillary atrophy of the tongue among tobacco users, its clinical characteristics and the long-term behavior in relation to changes in tobacco use was studied in 182 individuals in Ernakulam district, Kerala, India. Almost all (98%) lesions occurred among bidi smokers. Clinically, about 31% occurred in combination with bidi smoking associated lesions such as palatal erythema (14%), leukoplakia (8%) or both (3%). Histologic evaluation in 12 biopsies using single PAS stained sections showed candidal hyphae in 67%. A 10-yr follow-up (mean: 6.7 yr) of the 182 lesions showed that the regression was highest (87%) among those who stopped their smoking habit and persistence among those who did not reduce or stop their smoking habits. The findings from this study confirm a strong link between bidi smoking and central papillary atrophy of the tongue in rural Indian populations.

OC Epi India (1989) San: Case-control study.

Sankaranarayanan R, Duffy SW, Day NE, Nair MK, Padmakumary G. A case-control investigation of cancer of the oral tongue and the floor of the mouth in southern India. *Int J Cancer* 1989 Oct 15;44(4):617-21.

(MRC Biostatistics Unit, Cambridge, UK)

A case-control study of cancer of the oral tongue and floor of mouth was conducted in Kerala, Southern India, on 228 cases and 453 hospital-based controls, matched for age, sex and religion. We studied pan (betel)-tobacco-chewing, bidi (local type of cigarette)-and-cigarette-smoking, alcohol-drinking and snuff use, for their associations with risk, in males. Among females, only pan-tobacco-chewing was analyzed, as very few females indulged in the other habits. In males, a significantly increased risk was observed in association with pan-tobacco-chewing, bidi-smoking, bidi-plus-cigarette-smoking (but not cigarette-smoking alone) and alcohol-drinking ( $p$  less than 0.001 in all cases), although the effect of alcohol was no longer significant when adjusted for the other significant predisposing factors. Among females, pan-tobacco-chewing had a similar predisposing effect to that observed in males ( $p$  less than 0.001). In males an adjusted relative risk of 6.14 was associated with chewing 10 or more pan-tobacco quids per day (relative to those who never chewed). The corresponding relative risk in females was 9.27. In males; an adjusted relative risk of 7.46 was observed for those smoking 20 or more bidis per day (relative to never-smokers).

OC Epi India (1989) San: Case-control study.

Sankaranarayanan R, Duffy SW, Padmakumary G, Day NE, Padmanabhan TK. Tobacco chewing, alcohol and nasal snuff in cancer of the gingiva in Kerala, India. *Br J Cancer* 1989 Oct;60(4):638-43.

(Regional Cancer Centre, Trivandrum, India)

A case-control study of cancer of the gingiva was carried out in Kerala, Southern India, using 187 cases and 895 hospital-based controls. We investigated the effects on risk in males of pan (betel)-tobacco chewing, bidi and cigarette smoking, drinking alcohol and taking snuff. In females only pan-tobacco chewing was investigated as very few females indulged in the other habits. Among males, significant positive associations with risk were observed for pan-tobacco chewing ( $P$  less than 0.001), bidi smoking ( $P$  less than 0.001) alcohol drinking ( $P$  less than 0.001) and snuff use ( $P$  less than 0.05). In females, pan-tobacco chewing had a similar predisposing effect ( $P$  less than 0.001). Daily frequency of pan-tobacco chewing was the strongest predictor of risk in males, with a relative risk of 15.07 associated with chewing ten or more quids per day. The corresponding relative risk among females was 13.69. In males a relative risk of 3.20 was associated with smoking more than 20 bidis per day, and relative risks of 2.62 and 3.90 were associated with regular use of alcohol and snuff respectively. Surprisingly high relative risks were observed in association with occasional use of pan-tobacco, bidi, cigarettes, alcohol and snuff. A stepwise logistic regression analysis yielded four predictors: pan-tobacco daily frequency, duration of bidi use, and alcohol and snuff use (regular versus never). There were also significantly elevated risks associated with occasional indulgence in these four habits. Total lifetime exposure was no better at predicting risk than daily frequency or duration of habits.

OC Epi India (1988) Nar: Case-control study.

Narayanan RS. A comparison of cancer educational resources to prevent smokeless tobacco usage in India and the United States. *J Cancer Educ* 1988;3(4):257-8.

The prevalence of smokeless tobacco use in India is much higher than in the United States, but health education materials on smokeless tobacco are much more widely available in the United States than in India. High incidences of oral cancer among both men and women in India is attributed in large measure to smokeless tobacco use, chewed especially in pan (betel quid), but there are many more forms of smokeless tobacco in use in India than in the United States. The reasons for the paucity of educational materials on smokeless tobacco seem to include: the fact that infectious diseases, being very common, are the main focus of most health education materials; health professionals are reluctant to use their skills in preparing and advising on the preparation of such materials; there is a lack of an indigenous cancer education strategy, financial resources are limited; the establishment of a national cancer control plan and Regional Comprehensive Cancer Centres are only recent phenomena. There is a need for more print and audiovisual materials. This should be done keeping in mind the high quality of tobacco advertising that commands the attention of the public, as well as current trends in tobacco use patterns. Educational material must be attractive, with simple language and unequivocal meaning: it should incorporate messages about all forms of tobacco chewing and smoking. Skilled commercial artists should be motivated to work with health professionals and health authorities in preparing these materials.

OC Epi India (1987) Gupta: Letter

Gupta P.C., Mehta F.S., Pindborg J.J. Oral Cancer in Rural India. *The Lancet*; May 9, 1987:1087.

SIR, Where oral cancer is common the mortality from this disease is high. Yet the mouth is easily accessible and oral cancer is detectable at an early stage. Most patients seek medical help only when the disease is advanced. Since high risk individuals seldom volunteer for oral examination at central screening centres one suggested approach is for secondary prevention via case-finding in house-to-house surveys.

The incidence of oral cancer, especially palatal cancer, is high in Srikakulam district, Andhra Pradesh, due to the widespread habit of reverse chutta smoking - ie, smoking home-made cheroots with the lighted end inside the mouth. In a behavioural intervention study for primary prevention of oral cancer nineteen villages were selected in this district. 12 038 tobacco chewers and smokers aged 15 years and over were examined in a baseline survey and followed-up annually by house-to-house visits. The examination was done by dentists specially trained in the early detection of oral cancer.

During the baseline examination and eight years of follow-up, 37 oral cancers have been diagnosed, of them palatal cancers. One was already advanced at the baseline examination; one patient died of oral cancer without a re-examination; and in two patients the diagnosis was based on hospital records. The remaining 33 were detected by examining dentists at a reasonably early stage, but of these 33 patients, who might have benefited from early detection, 24(72%) refused to attend for treatment despite the best persuasive efforts of the dentists and social scientists on the team. One patient claimed that he was sent back from hospital without treatment, and he refused to go again. Of the 24 patients refusing treatment 19 died, most of them within two years, and of the five survivors four have been followed up for one year and one for two years.

Although poverty was widespread in the area and the study population itself was poor the refusal of treatment was not for financial reasons since patients were reimbursed for travel treatment, and allied expenses.

Ignorance of the seriousness of disease was the main reason. However, it is well-known that in rural India death

is not considered as an event that needs to be postponed, especially after middle age-until of course, it becomes imminent, and even then medical assistance is mainly sought to alleviate physical discomfort.

We found that oral cancer patients coming to hospital from a rural area constitute only a small, self-selected group of all oral cancer in the population. Thus for research on the incidence and natural history of oral cancer a house-to-house survey should be a preferred approach. Our findings also suggest that the house-to-house approach (even though it can be done by specially trained basic health workers) may not prove very effective in terms of reducing mortality from oral cancer among the rural populations.

OC Epi India (1986) Jay: Descriptive report.

Jayant K, Deo MG. Oral cancer and cultural practices in relation to betel quid and tobacco chewing and smoking. Cancer Detect Prev 1986;9(3-4):207-13.

Oral cancer is the most common cancer in India, Pakistan, and Sri Lanka and ranks high in several southeast Asian countries. The association of these cancers with cultural practices like chewing was recognized almost a century ago. Continued work since then has identified tobacco use as the most important avoidable cause of oral cancer. Critical appraisal of specific cultural practices that lead to high risk of oral cancer will be presented with a focus on possible strategies for prevention programs. The need to monitor cultural changes such that these changes lead to prevention of cancer and not a shift from one type of cancer to another will be emphasized.

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## polyol

### 1. n. [Drilling Fluids]

A generic name for low molecular weight, water-soluble polymers and oligomers containing number of hydroxyl groups. Specific examples include glycols, polyglycols and polyglycerols used in water-base fluids as shale inhibitors and gas hydrate inhibitors.

See: [glycol](#), [oligomer](#), [polyalkalene glycol](#), [polyglycerol](#), [polymer](#)